Nov. 10, 1925. 1,560,708

F. E. MESTA

ANNEALING BOX

Filed Jan. 13, 1925

Fig. 1.

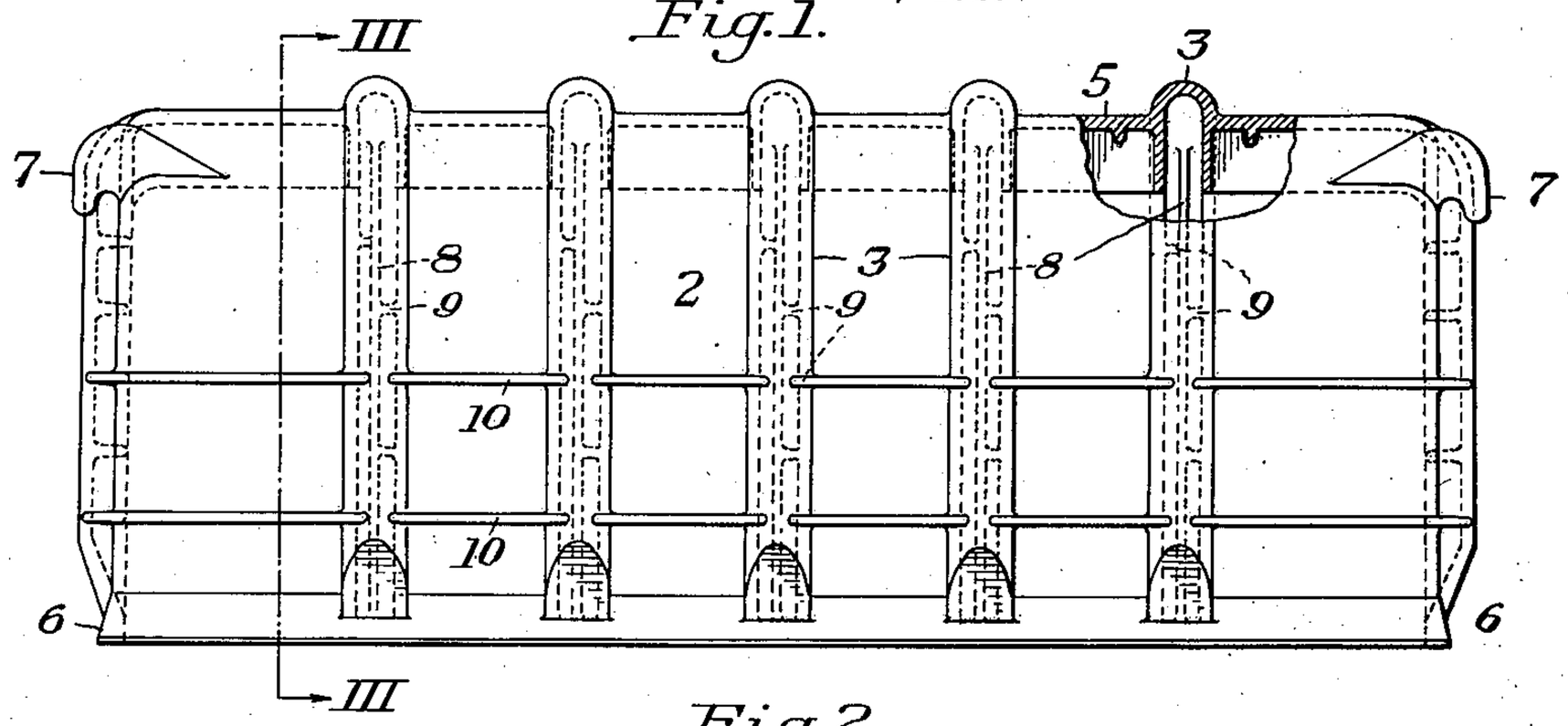


Fig. 2.

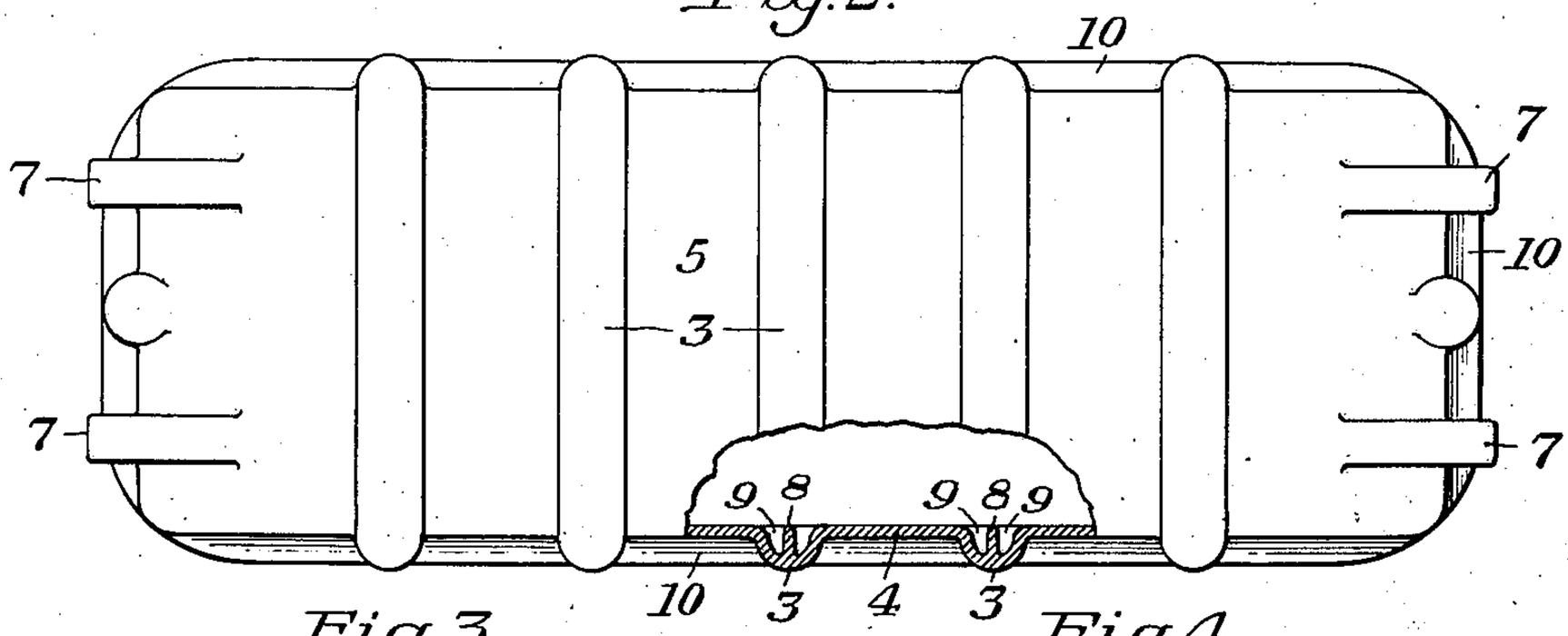


Fig. 3.

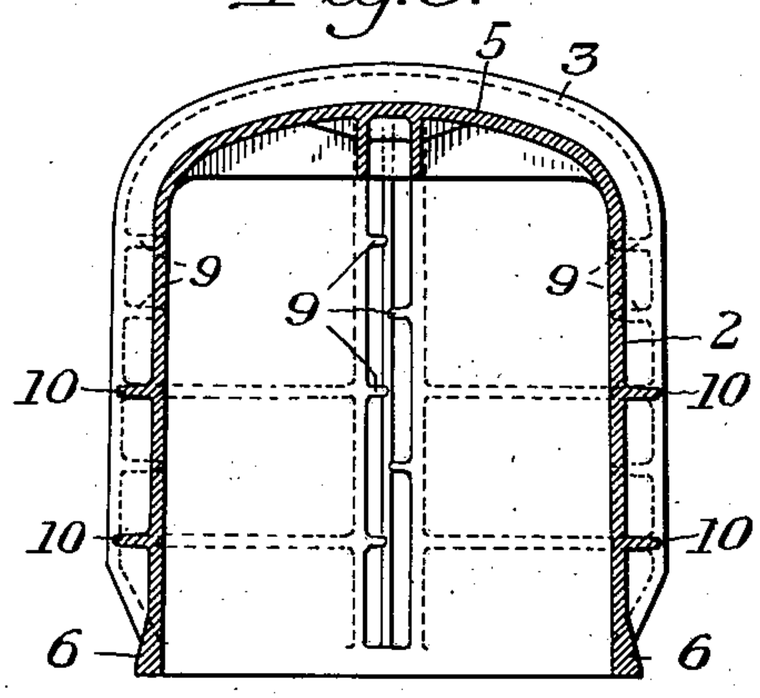
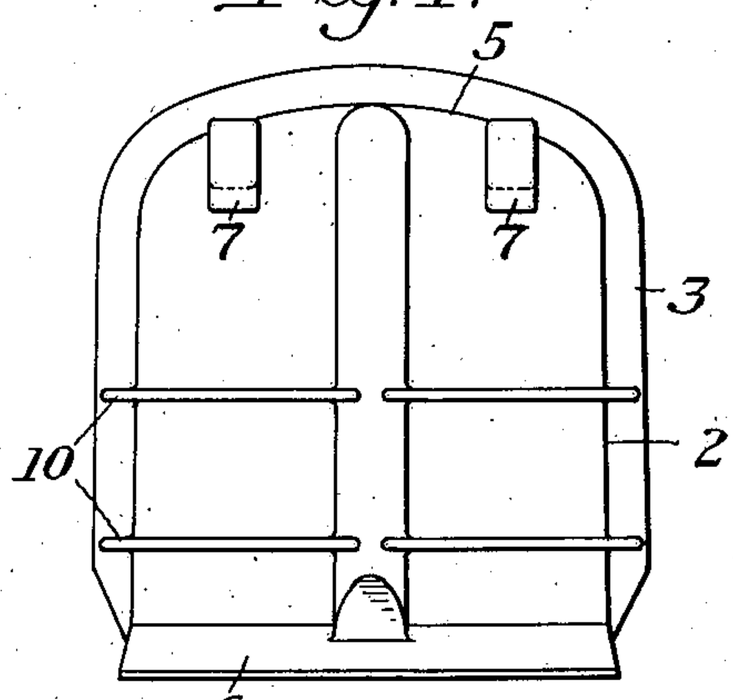


Fig. 4.



Inventor
Frederick C. Mesta,
By Byrnes, Stevens & Parmelee,
his Attorneys

Patented Nov. 10, 1925. 1,560,708

UNITED STATES PATENT OFFICE.

FREDERICK E. MESTA, OF WEST HOMESTEAD, PENNSYLVANIA, ASSIGNOR TO MESTA MACHINE COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

ANNEALING BOX.

Application filed January 13, 1925. Serial No. 2,142.

To all whom it may concern:

Be it known that I, FREDERICK E. MESTA, a citizen of the United States, residing at West Homestead, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Annealing Boxes, of which the following is a full, clear, and exact description.

The present invention relates broadly to annealing boxes, and more particularly to covers of the cast type as commonly used in the art.

At the present time, the high requirements of manufacture as to the quality of sheets, particularly where used in automotive manufacture, has made the question of annealing boxes of prime importance. As cast annealing boxes of the larges sizes quite frequently weigh from 15,000 to 20,000 pounds and are sold on the pound basis, it becomes apparent that it is desirable to keep the weight as low as possible while maintaining the desired characteristics as to strength and durability. As the life of boxes is measured by the number of heats they can withstand, it will be apparent that any increase in the number of heats means a reduction in the cost per pound of sheets annealed therein.

It is essential to provide a box having a minimum amount of clearance between the interior of the side walls and the edges of the sheets with which the box is to be used. as in this manner the amount of air tending to produce oxidation of the sheets, and the body of air tending to blanket heat transmission from the box to the sheets are both reduced. This results in a better quality sheet and enables the annealing temperature of the sheets to be reached with a lower box temperature, and consequently less damage to the box.

One of the chief difficulties with boxes as heretofore constructed has been the tendency of the top to sag and the sides to bulge or crack. The bulging of the sides frequently reduces the box dimensions to such an extent that continued use thereof with sheets of the size for which it was constructed is impossible, while cracks permit infiltration of air with resulting increased oxidation.

It is one of the objects of the present invention to construct a box of minimum weight, minimum clearance or air space and maximum strength with respect to the number of heats.

In the accompanying drawings there is shown, for purposes of illustration only, a preferred embodiment of the present invention, it being understood that the drawings do not define the limits of my invention, as changes in the construction therein disclosed may be made without departing from the spirit of the invention or scope of my broader claims.

In the drawings:

Figure 1 is a side elevation of one form of annealing box constructed in accordance with the present invention;

Figure 2 is a top plan view, partly broken away and partly in section, of the box shown in Figure 1;

Figure 3 is a transverse sectional view on the line III—III of Figure 1, looking in the direction of the arrows; and

Figure 4 is an end elevation of the box.

In carrying out the present invention, there may be provided a cast body 2 having portions of its side, end and top walls displaced out of the main plane of the body to provide reinforcing ribs or swells 3. Preferably this displacement will not only be outwardly relatively to the plane of the box body but also outwardly relatively to the interior of the box, whereby the relatively flat portions 4 connecting adjacent reinforcements will define the major portion of the interior walls, thereby reducing the air space to a minimum. The reinforcements 3 in the side walls are preferably continued entirely across the top 5 of the box, whereby a continuous reinforcement in a common transverse plane for both the side walls and the top is provided with each of the swells. The end swells, however, as clearly indicated in Figures 2 and 4, preferably terminate at substantially the junction of the end walls and the roof.

At its lower edge the box cover is conveniently formed with a reinforced edge or base 6 adapted to cooperate with a box bottom, as well understood in the art. As this portion of the box is usually protected, to some extent at least, by sand or other sealing material provided for the purpose of cutting

down air leakage to a minimum, it is not subjected in use to the high temperature differences to which the remainder of the box is subjected. For these reasons, the reinforcements 3 may gradually die out adjacent the bottom edge as shown in the drawings.

The roof 5 is preferably transversely arched to obtain additional strength, tending to prevent sagging of the top during use, and the ends may be formed with suitable hooks or projections 7, facilitating lifting of the cover.

I am aware that it has heretofore been proposed to construct cast boxes having reinforcements formed by displacing a portion of the box body out of the plane thereof, whereby a substantially uniform thickness throughout the body and the reinforcements to obviate abrupt changes in section is provided. Such reinforcements not only provide additional strength but serve to permit longitudinal expansion and contraction, as well understood in the art. The bottom edge of such boxes ordinarily tends to prevent any undue changes in dimension of this portion under contraction and expansion due to temperature changes, but after a certain number of heats the top commences to permanently sag due to the failure of the side walls and the stretching of the material.

In order to overcome this failure of the side walls, it has been proposed to provide each of the reinforcements with an inwardly projecting rib 8, tending not only to decrease the free air space within the body of the cover but also serving to further stiffen the side walls. In actual use, however, under the extreme temperatures to which the boxes are subjected, these ribs tend to fall over laterally against the sides of the reinforcements, thereby shortening their overall length and permitting the objectionable sagging before referred to.

I have found that this sagging can be very materially reduced by the provision of short tie ribs 9 extending from the main rib to the sides of the reinforcements. It is essential, however, that these tie ribs or braces be staggered, as clearly indicated in the drawings, so as not to destroy the flexible characteristics of the reinforcements, but still serving to hold the ribs 8 against distortion, whereby the original strength of the box is maintained. The provision of these short braces or ribs 9 constitutes a very important feature of the present invention as they greatly increase the strength of the box without reducing its susceptibility to expansion and contraction without cracking during successive periods of heating and cooling.

For further strengthening the box I have found it desirable to tie the sides of successive reinforcements 3 together by means of outwardly projecting longitudinally extending ribs 10 and ribs throughout the main portion of the length and width of the box having a width substantially equal to the depth of the reinforcements 3. It is important that these ribs do not extend as unbroken bodies continuously across the reinforcements 3, as otherwise they would interfere with the flexibility for which the reinforcements are relied upon. At the corners of the boxes the ribs 10 preferably die down, as clearly indicated in Figure 2, as the corners themselves function somewhat in the manner of the swells or reinforcements 3.

The advantages of the present invention arise from the provision of a cast annealing box having reinforcements formed by displacing a portion of the body out of the main plane thereof to form swells, and further reinforcing these swells by centrally extending ribs which are in turn tied to the sides of the swells by staggered braces.

Further advantages arise from the provision of a box of this character having longitudinally extending reinforcing ribs tending to tie the sides of adjacent swells without interfering with the expansion and contraction of the box.

I claim:

1. In an annealing box, a supporting wall having portions thereof swelled to form reinforcements, ribs extending lengthwise throughout a portion at least of some of said swells, and means for tying said ribs to at least one side wall of the swell, substantially as described.

2. In an annealing box, a supporting wall having portions thereof swelled to form reinforcements, ribs extending lengthwise throughout a portion at least of some of said swells, and means for tying opposite sides of said ribs to the walls on both sides of the swell, substantially as described.

3. In an annealing box, a supporting wall having portions thereof swelled to form reinforcements, ribs extending lengthwise throughout a portion at least of some of said swells, and staggered means for tying opposite sides of said ribs to the walls on both sides of the swell, substantially as described.

4. In an annealing box, a supporting wall having portions thereof swelled to form reinforcements, a rib extending lengthwise throughout a portion at least of each swell, and means for tying said rib to the walls of the swell, substantially as described.

5. In an annealing box, a supporting wall having portions thereof swelled to form reinforcements, a rib extending lengthwise throughout a portion at least of each swell, and staggered means for tying said rib to the walls of the swell, substantially as described.

6. In an annealing box, a supporting wall having portions thereof swelled outwardly to form reinforcements, inwardly project-

ing ribs in said reinforcements, and means for tying said ribs to the walls of the swells, substantially as described.

7. In an annealing box, a supporting wall having portions thereof swelled outwardly to form reinforcements, inwardly projecting ribs in said reinforcements, and means staggered on opposite sides of the ribs to tie the same to the walls of the swells, substantially as described.

In testimony whereof I have hereunto set my hand.

F. E. MESTA.